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JANUARY 28, 1888.

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VOL XXIII. REGULAR EDITION NO. 631.

ARCHITECTURE

ENGINEERING

DECORATION

CONSTRUCTION

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ILLUSTRATIONS.

Church of St. John the Baptist, Quebec, Canada.
[Gelatine Print issued only with Gelatine and Imperial editions.]
"Greene's Inn," Narragansett Pier, R. I.
The Paris Opera-house.
Business Block, Cleveland, Ohio.
Part of the Facade of the University of Salamanca, Spain.

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IT seems likely that the proposition which has more than once been made, that the Government of the United States should establish a Bureau of Fine Art to have charge of transactions by the public authority requiring a knowledge of this subject, may be definitely brought before Congress at the present session. While we should be very sorry to see an official board interfering with the teaching or practice of any sort of fine art in this country, it is certainly not to our credit that the most pitiable examples to be found in it of bad taste, and of gross ignorance and indifference in regard to subjects which even here are considered to form a necessary part of a decent education, are those presented by the works which are executed for the people of the United States by direction of the supreme legislative authority; and the provision of some sort of official board of reference, to whom might be referred, as is now done in New York, the question of the suitability of proposed plans for decorating the public property, would be an excellent thing. At the same time, we have very little expectation of seeing any such measure adopted at present. A large proportion of the people of the United States are at present in a condition of such absolute ignorance of everything relating to the fine arts that they cannot conceive that there is anything about the subject that they do not know, and this element is well represented in the national legislature. Moreover, with all of us, promotion to a position of authority is apt to bring with it a sensation of omniscience which naturally finds itself more at ease in dealing with matters of taste and feeling than those which are concerned with scientific realities, so that legislators who suffer occasional wounds to their complacency through mishaps about their representations of fact are likely to be all the more tenacious of their privilege of asserting themselves in matters where their opinions cannot be so effectually controverted. We all remember the governor who, when it was suggested that it might be well to have an expert opinion on the plans of a new State-house which was to be carried out under his administration, replied, with asperity, that he "would rather trust his own opinion than that of any four architects in the United States," and that the plans suited him; and this is too widespread a feeling among politicians to be easily overcome. Indirectly, perhaps, the result might be brought about more easily in another way. It is often proposed to hold the executive and the legislative branches of our Government more closely to their duties by giving the members of the Cabinet seats in the House of Representatives, where they will be ready to answer questions as to their acts. Whatever effect this change might have in other matters, it would be highly advantageous to the public administration of the fine arts. While Congress is impersonal and irresponsible, and can with impunity appropriate enormous sums of public money to buy worthless pictures executed by fascinating females with curls, a Cabinet minister could be brought to account at once, and an interpellation in the French manner, addressed to a high executive officer on the floor of the House by a clever political opponent, on the subject of a Vinnie Ream contract, or some similar transaction, would be a lesson which would not need to be often repeated.

THE programme for the Second Annual Convention of the National Association of Builders of the United States of America has just been issued, and promises a most interesting meeting. The Convention, which naturally is composed of delegates from the various exchanges and other builders' associations, with their wives, who are thoughtfully invited as guests of the Association, meets in Cincinnati on Tuesday, February 8th. The session continues three days, but delegates are invited to remain over another day, Friday, in order to enjoy the hospitality of the members of the local organization. In addition to the regular business, which is likely to be this year of great importance, provision has been made for the reading of three papers, one on "Improvements and Advances made in Stone-cutting," by Mr. Charles F. Cheney, of Boston, the second on "Improvements and Advances made in Carpentry," by Mr. William Goldie, of Chicago, and the third on "Improvements and Advances made in Roofing," by Mr. E. E. Scribner, of St. Paul. These subjects, treated by experts, make the convention interesting to the outside world, as well as to builders and architects, and the latter will be hardly less curious to hear the discussions on the reports of the Committees on Uniform Contracts, on Uniformity in Lien Laws, and on Rules for Estimating Work, which are to be made at this session. Provision has been made for securing rooms for delegates at the Gibson House in Cincinnati, but in order to make sure of these the names of delegates should be sent at once to the Secretary, Mr. William H. Sayward, Boston, as well as to Mr. L. H. McCammon, Secretary of the Builders' Exchange, corner Sixth and Vine Streets, Cincinnati.

THE Italian Government has attacked the subject of theatre construction in a new, and, we think, the only effectual way. In a circular addressed to all the prefects of the Kingdom, it calls attention to a new and brief regulation, under which every theatre hereafter built or altered must be entirely isolated, and possess on each front one or more doors giving access from the floor directly to the street. Besides these, there must be at least two doors leading from the outside directly to two or more staircases communicating with the boxes. These doors must be exclusively reserved for the use of the spectators in the boxes. It is forbidden to build more than three tiers of boxes above the ground-floor, but one gallery may be added, on condition that it is served by two staircases and at least two outside doors, exclusively belonging to it. All stairways and corridors must be wide and convenient, and all doors must open outward; and, for the benefit of the actors, a door must open directly from the back of the stage to the street. It is hardly necessary to say that such a theatre as this regulation prescribes, and only such a one, is, if constructed of solid materials, such as are used in Italy, practically safe, without the use of iron or asbestos curtains, sprinklers, automatic ventilators, or any other of the ingenious but unmanageable devices which, it must be said, serve mainly to delude audiences into a false sense of security. Whether it will be pleasing to the theatrical managers is another question. For a theatre with three tiers of boxes and a gallery it will be observed that the minimum number of outside doors permitted is eight, and as the law, unless intended to be simply a farce, must provide that all these shall be kept open during a performance, the management will be compelled, unless some method of ticket-taking not yet in use shall be invented, to maintain ticket sellers and takers at each entrance, to the serious detriment of the profits. In addition to this, the requirement that the structure shall stand on an isolated lot will drive the builders of theatres to the most costly sites, in place of the comparatively inexpensive ones which are now utilized for such purposes, and the interest account will be correspondingly increased. These considerations will undoubtedly lead to resistance on the part of managers to the regulation, and, if it is enforced, to the diminution of the number of theatres in Italy, but between the blessings

of having theatres numerous, and having them safe, we imagine that the public will in the end prefer the latter.

WE doubt if many persons know what the highest buildings in Great Britain are, or what they are used for. At present, the loftiest structure in the British Islands is the chimney of a fertilizer factory in Glasgow, which rises to the height of four hundred and sixty-six feet above the ground. The motive of its construction is, it seems, as unromantic as the object itself. The factory happened to be situated in the midst of a dense population, which, before the new chimney was built, complained bitterly of the stench from the burned bones and offal used in the manufacture of the fertilizer. The proprietors did not wish to move their business to a less thickly settled region, so, when the remonstrances of the neighbors became so pressing that they could no longer be disregarded, a compromise was made by which the manufacturers undertook to discharge the foul vapors from their processes so far above the heads of the citizens as not to be troublesome; and the chimney was built to effect this object. The celebrated chimney of the Saint-Rollox Chemical Works, also in Glasgow, which is four hundred and forty-six feet high, and was for many years the highest building in the world except the Great Pyramid, was also constructed for the purpose of discharging acid vapors out of the way of the townspeople, rather than with the idea of gaining a strong draught for the furnaces. It seems from an interesting article by Dr. Hector George, in *Le Génie Civil*, that the use of very high chimneys is likely to become more general, as their advantages are better known. For the present, it appears to be impracticable to get rid of noxious fumes from manufacturing processes. The combustion of coal alone not only sends into the air enormous quantities of carbonic acid, but of sulphurous acid, a suffocating and poisonous gas, of which nearly two million cubic feet are discharged every day by the chimneys of Manchester alone. Associated with these vapors, in places where soft coal is burned, are usually many tons of unconsumed carbon, in the shape of soot, which forms the most obvious, though not the most deleterious ingredient of a smoky atmosphere. Not long ago great efforts were made in manufacturing countries to suppress the smoke fumes, by requiring the use of "smoke-consuming grates" and other devices, but, according to Dr. George, these are almost abandoned, experience having shown that careful firing, in which the coal is spread evenly and thinly over the grate bars, will do more to prevent smoke from it than any consuming device yet invented. In fact, the interesting competitive tests between stokers, with the pressure exerted upon them by their employers, who sometimes deduct from their wages a part of all fines imposed for allowing smoke to escape from the chimney, have made a change in the practice of that modest profession, and furnaces are now so managed, with the ordinary appliances, as to throw off no unconsumed carbon. The incombustible gases, however, are discharged in greater volumes than ever, scattering sulphuric, nitric, carbonic, hydrosulphuric and hydrochloric acids through the atmosphere; and the best method of obviating bad effects from them is found to be by exposing them to the greatest possible amount of dilution and condensation before they reach the earth by pouring them out into the atmosphere at as great a height as possible. One of the sources of noxious vapors which Dr. George mentions is new and curious. It appears that the demand for artificial hair in Europe is now so great that it cannot be supplied from the home markets, and great quantities of human hair are imported from Japan, China and India. Naturally, the black locks of the Asiatics do not match well with that of the European customers of the Paris wig-makers, and it is necessary to color them, which is done by boiling them in nitric acid until they are bleached to the required tint. This process develops quantities of nitrous acid vapors, which are suffocating to the persons engaged in the work, although not very dangerous to those at a distance.

EVERY one has seen some of the wide planks of redwood which occasionally appear in the Eastern markets, but few persons outside of California know the gigantic dimensions in which redwood lumber may easily be obtained from mills which possess machinery capable of sawing it. We remember seeing once a solid redwood plank five feet wide, which was the admiration of the building portion of the town for a time; but, according to the *California Architect*, this was small compared with some to be had in the vicinity of the redwood forests. Not long ago the managers of a State fair in California sent circulars to the saw-mills, inviting exhibits of redwood planks. In response to this a certain mill sent a "good-sized" plank, which measured six feet in width. Hearing of this, the proprietors of another mill worked up some planks eighty inches wide, and sent samples for exhibition; and soon afterwards a third establishment, the McKay mill, forwarded a lot of perfectly clear, sound planks and boards, varying in width from ten to eleven feet. If there were any special demand for such enormous pieces of this unrivalled timber, they would be more frequently seen, but the wood construction of the world has for a thousand years been based on the assumption that sawed sticks measuring more than twelve inches in breadth or depth of section would be costly, and difficult to obtain; and a new system must be made to suit the materials of the Pacific coast, or the redwood logs will continue to be subdivided into pieces approaching in size the Eastern lumber. On the other side of the water, the standard of size for framing timber is still smaller than with us. If we are not mistaken, few mediæval cathedrals on the Continent contain a stick larger than eight inches square in cross-section, and, although English timber was of larger dimensions a thousand years ago, there would be little difference now.

IN regard to the same matter of redwood lumber, another article in the *California Architect*, in the shape of a letter from a manufacturer of furniture, gives a suggestion which ought to be valuable. This gentleman, having worked redwood of all sorts, has found, as might be expected, that the lumber from the root, or from the trunk just above the root, is far more beautiful in figure, and more suitable in other respects for his purpose, than that taken from the upper portion of the tree. In consequence of this observation, he has been accustomed to visit farms in the redwood district, from which the timber had been cut, and offer to remove the stumps. These, in most cases, have been left in the ground, the cost of extracting them, or blowing them to pieces with gunpowder, having deterred both the lumberman and the farmer from meddling with them, while the latter, remembering the spruce stumps of the East, has comforted himself with the expectation that they would soon rot away. Unfortunately for this theory, the redwood is very durable, and as a quarter of a century has passed over many of the stumps without producing any symptom of decay in them, the farmers have become tired of ploughing around them, and are glad to accept a proposal to take them away. On his side, the furniture manufacturer finds himself abundantly supplied with the material he likes best, at the cost of getting it, and finds it, when worked up, so useful and popular that he seriously asserts that by proper treatment the stumps alone on a farm in the redwood region "can be made to bring more money than the price of the land and the value of the timber which has been cut from it." Extravagant as this claim seems, the experience of the farmers in the black-walnut district of Ohio indicate that if not entirely reasonable now, it is likely to be so before many years. Hundreds of Ohio farmers, who have toiled half their lives in clearing their land and "improving" it by cultivation, would be far richer to-day if they had never touched it at all; and if there had been any with taste and foresight enough to leave some clumps of the beautiful black-walnut trees to diversify their farms, and had used a little forestry science in managing them, they would by this time have found the crops from the uncleared land by far the most valuable resource of the estate. To us there is something sad in the sight of an agricultural region, which has once been enthusiastically and laboriously denuded of its forests, reverting, as southeastern Massachusetts now is, to the slow and painful cultivation of the same forest-trees which were cleared away with such zeal by the men whose grandsons can find no more profitable crops to grow on the farms which they have inherited than the very trees which their ancestors exterminated with axe and fire. Moreover, the descendants of the Pilgrims are glad to sell the knotty, defective product of their "second growth" forests for one-third the price that the timber from their grandfathers' trees would bring if it had been let alone, and the Ohio farmers, when they return to the cultivation of the black-walnut, as they probably will, are likely to get a similar lesson on the value of moderation in throwing away one's present blessings for the sake of making room for possibilities of fortune of some other kind.

OPEN-TIMBER ROOFS OF THE MIDDLE AGES.[1]—II.

(*B*) *Roofs without Tie-Beams.*

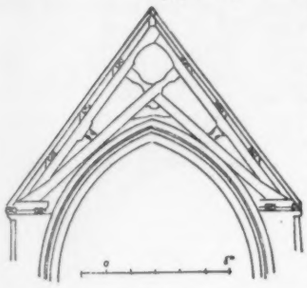


Fig. 19.
[After Viollet-le-Duc.]

THE invention of roofs without tie-beams is sometimes said, however, to have resulted from the substitution of stone vaults for wooden roofs. This statement is obviously based on the assumption that the vaults rose above the level which would be occupied ordinarily by the tie-beam (Fig. 19). The cathedral of Autun and the churches of Beaume and Sanlieu are cited by Viollet-le-Duc as examples of this kind of vaulting. Such construction, however, was exceptional. In the vast majority of instances the vaulted ceiling will be found to rise no higher than the feet of the rafters. A typical example is that given in Figure 1, [No. 630.]

Roofs without the tie-beam are of rare occurrence in France.

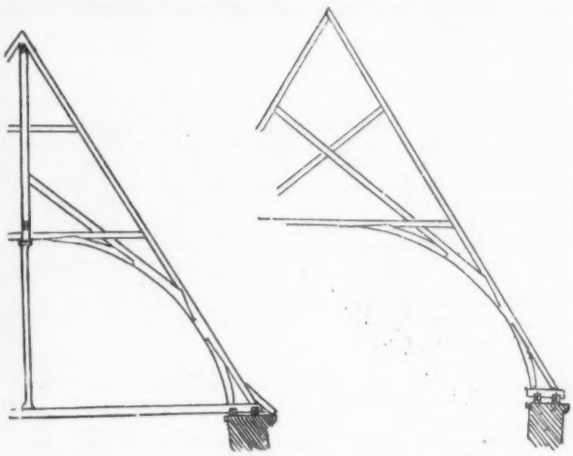


Fig. 20, *a*. Fig. 20, *b*.
[After Viollet-le-Duc.]

Like the Romans, the French never made much of a departure from the simple king or queen post truss. In the roof over the Episcopal Palace of Auxerre there are some trusses without the tie-beam (Fig. 20, *a* and *b*). This roof is noticeable for its steepness, its lightness, and elegance, and also for the introduction of inclined cross-braces, which throw the framing into a system of triangles, thereby greatly increasing its rigidity. But if we wish to see good examples of roofs without the tie-beam, we must go to England. "*Si nous voulons voir des charpentes apparentes dont l'ecartement est maintenu sans entraits, et au moyen d'un système d'assemblage different de ceux que nous venons d'examiner, il faut aller en Angleterre*" (Viollet-le-Duc). The English roofs of the Gothic period are generally without the horizontal tie-beam, and for nicety of execution and elegance of form are unsurpassed.

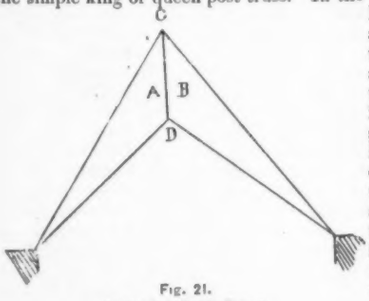


Fig. 21.
[After Viollet-le-Duc.]

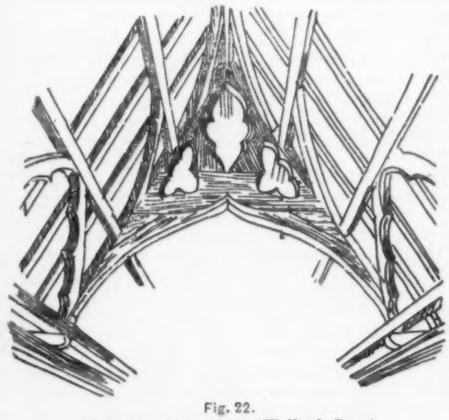


Fig. 22.
Malvern Abbey. [After Viollet-le-Duc.]

[1] Continued from No. 629, page 17.

(*B* 1) *Trussed-Rafter Roofs.* — In order to get rid of the tie-beam, says Viollet-le-Duc, the Anglo-Normans had to solve this problem, viz., to give to the triangles *A* and *B* (Fig. 21) a common base, *CD*. When this was done the tie-beam could be dispensed with. The roof over Malvern Abbey (Fig. 22) is a good example of one solution of this problem. The merits of this design, however, are more than counterbalanced by its defects. Extravagance of material is not a feature of any good design. Due regard must be had for economy in the sense that all material used in addition to the amount required for stability should be offset or compensated for by the attainment of some desired effect, as dignity or grandeur. The end should justify the means. In a good timber roof, for example, strength and lightness must be combined, the one being essential to safe construction, the other to artistic effect.

The heavy and oppressive effect of the early roofs has been referred to. The roof at Malvern Abbey is an example of one of the first attempts to overcome this defect, but the construction of this roof calls for an excessive amount of timber, making it so heavy that it could never be used for anything but a small span. Moreover, it was expensive to a degree that may be fairly considered inadequate to the result obtained. The tie-beam was dispensed with, but at too great a sacrifice of economy, and the depressing effect of the tie-beam roof had been only partially done away with.

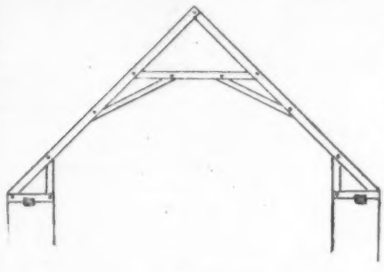


Fig. 23.
[After Tredgold.]

The practical solution of the problem was found in what is known as the "trussed-rafter" roof, which was much used in the Early English and Decorated periods. The general scheme of its construction is shown in Figure 23. Every pair of rafters is provided with a collar-beam and braces. The latter may be straight or curved and above or below the collar-beam. The trussed-rafter roof is distinguished from all other roofs without tie-beams in that it is a single-framed roof — that is, one in which every pair of rafters is trussed, there being neither purlins nor principals. There is, thus, no really characteristic form for this roof. In practice, however, it must be necessarily a simple one, for anything elaborate, repeated as it would have to be with every set of rafters, would prove very expensive and at a certain point a different kind of roof would recommend itself as giving a better effect with the same amount of material. Where the braces are curved, the effect of an arched ceiling is obtained, and if in this case the roof be sheathed, a wooden barrel-vault is produced. Polygonal-shaped ceilings (often called wagon-headed roofs) are of more frequent occurrence. The trussed-rafter roof thus admits of great variety in treatment inasmuch as it is purely a question of taste where the ceiling shall be put. (See Figs. 24, 25, 26.) Brandon holds to the opinion that originally none of the roofs of the trussed-rafter form were intended to be sheathed. In modern roofs, however, it is oftener done than not.

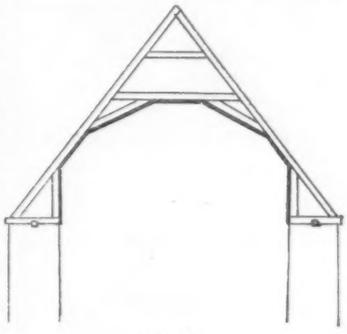


Fig. 24.

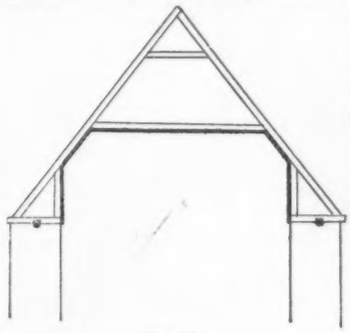


Fig. 25.

(*B* 2) *Hammer-Beam Roofs.*—The general principles of hammer-beam construction are shown in Figure 27, in which *HH* are the hammer-beams, *WW* the wall pieces, *BB* hammer-beam braces, *SS* hammer-beam struts, *C* collar-beam, etc. The ordinary form which this roof takes is shown in Figure 28. It will be seen that the construction of this form of roof is based on that property peculiar to the triangle, namely, that the angles cannot change so long as the sides remain of the same length. In the hammer-beam roof, the various timbers are so arranged as to form triangles. The joints at the angles are thus

rendered immovable and the rigidity of the framing is secured. In regard to the origin of the roof there have been several theories, but that advanced by Brandon seems to be the most reasonable. According to his theory the hammer-beam was developed directly from the triangular foot of the trussed-rafter roof (Fig. 29). This was used merely on a much larger scale, being made to project inwards and supported by a brace on the under side. That view of the hammer-beam roof which considers it a tie-beam roof with the central portion of the tie-beam cut out as it were, he proves to be erroneous inasmuch as it can be shown that the tie-beam roof had been discarded before the hammer-beam was introduced. The fact seems to be that neither the tie-beam nor the trussed-rafter roof were suitable for anything but moderate spans. A new form of roof had to be devised in order to meet the requirements of larger spans. Progress rarely, if ever, goes by leaps; it is gradual and proceeds by the improvement of existing forms, not by the direct invention of absolutely new ones. Accordingly, the particular form that the new roof took was probably suggested, in parts, at least, by the form of roof last in use, namely, the trussed-rafter.

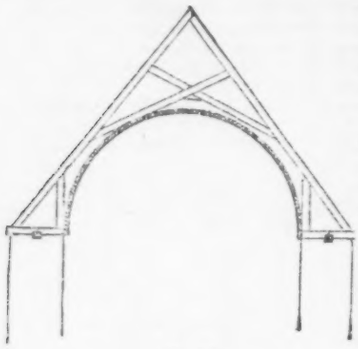


Fig. 26.

The hammer-beam is really a bracket or cantilever upon which the roof rests. Practically, it reduced the actual span of the roof, for it gave excellent support to the rafters at their weakest point, namely, near their feet. That is to say, as far as the rafters were concerned, the span was really only the distance between the hammer-beams. Thus a rafter of a given section which would be proper for a given span when used in a hammer-beam roof would for the same span when used in a tie-beam or trussed-rafter roof have too great a tendency to bend or sag. In other words, with timbers of a given section a larger span was possible than before.

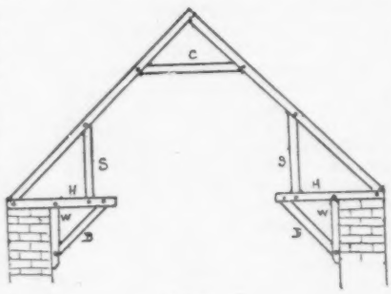


Fig. 27.
[After Tredgold.]

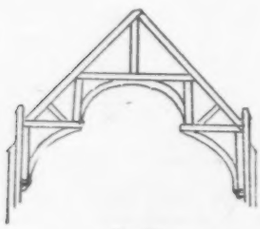


Fig. 28.
[After Tredgold.]

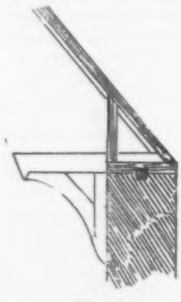


Fig. 29.
[After Brandon.]

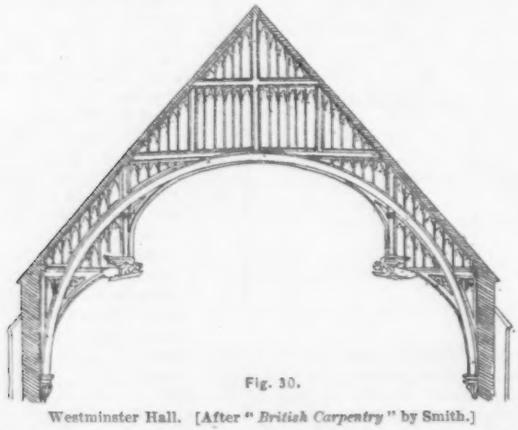


Fig. 30.

Westminster Hall. [After "*British Carpentry*" by Smith.]

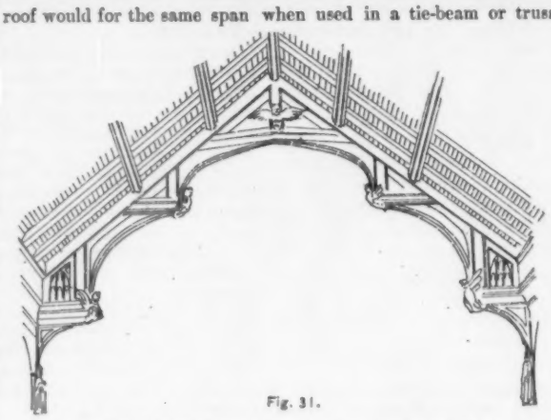


Fig. 31.

Nave of Knapton Church, Norfolk, Eng. [After Brandon.]

The new form of roof was also controlled to a certain extent by the character of the buildings erected at this time. In the Perpendicular period walls were pierced by large, lofty windows and strengthened in the spaces between the openings by narrow buttressed piers.

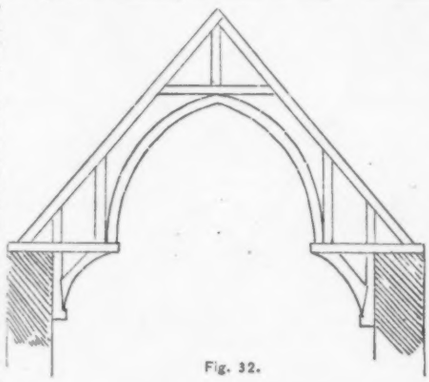


Fig. 32.

The trussed-rafter roof, which practically required continuous support, thus became impracticable. The new roof had, of necessity, to be one which could be supported at intervals. Moreover, the oblique thrust which the hammer-beam, in common with all roofs without a tie-beam, had a tendency to exert, was well met by the buttresses. Nor did these have to be built higher than before, for in this roof the thrust was brought well down on the wall. This style of roof, therefore, had many good qualities to recommend it. The rafters were well stiffened; the thrust of the roof was made not only more nearly vertical than it had been with the trussed-rafter roof, but was also brought lower down on the walls where it could be easily met by greater lateral resistance; the construction was of such a nature that it could be executed by a combination of small pieces; and finally, its great beauty, as much as anything else, perhaps, brought it into great favor.

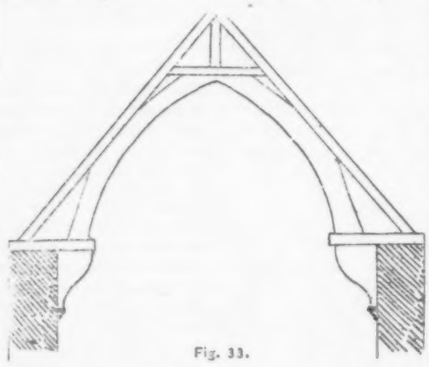


Fig. 33.

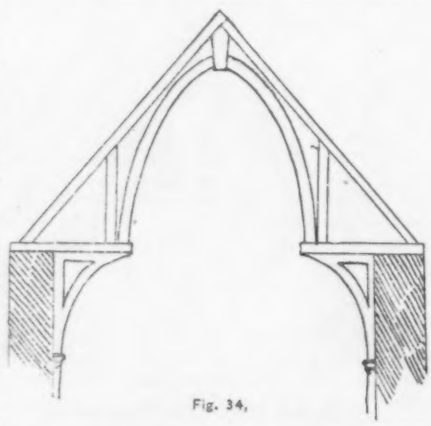


Fig. 34.

The largest and most magnificent specimen of a hammer-beam roof is that over Westminster Hall (Fig. 30). This roof covers a hall two hundred and thirty-nine feet long by sixty-eight feet wide. A striking feature is the large timber arch which spans the entire width of the hall. This arch obviously plays an important part in the construction and is not merely decorative. What is a most singular fact is that this roof (1397) is the earliest known specimen of

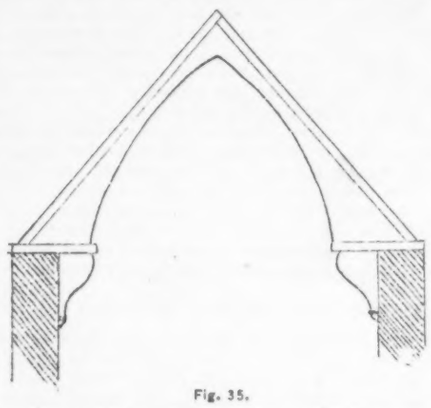


Fig. 35.

the hammer-beam variety. It is scarcely possible, however, as Brandon observes, that a design so bold, complete and successful could have been among the first to have been executed. Beautiful specimens of hammer-beam roofs of more moderate spans are found in the churches of Norfolk and Suffolk. Many of these have a second hammer-beam introduced (Fig. 31). The multiplication of hammer-beams can hardly be considered an improvement, for, though it gave greater richness of effect, it did not bring increased strength to meet the greater weight thus given to the roof.

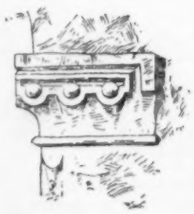
Hammer-beam roofs almost defy classification, but the following list will be found to comprise nearly all the different varieties.

1. Complete — with braces, struts, as in Figures 28 or 32.
2. With no struts, as in Figure 33.
3. With no collar-beam — braces curved to ridge, as in Figure 34.
4. With no collar-beam and no struts, as in Figure 35.

[To be continued.]

PARIS GOSSIP.

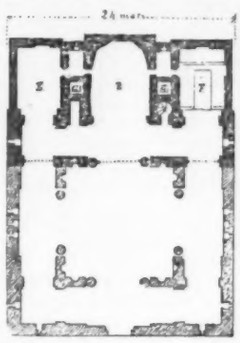
THE NEW CREMATORY. — EXHIBITION OF PUVIS DE CHAVANNES'S DESIGNS.

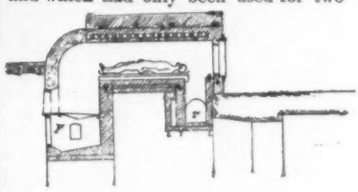


CAPITAL FROM DEEPHURST CHURCH

On the 25th of October experiments the results of which were not absolutely satisfactory were made at the crematory recently built at the cemetery of Père Lachaise. On the 15th of last month I was present at the new experiments which produced better results. A society for the propagation of cremation, founded in 1880, and comprising a number of experts, have made an active crusade in support of this reform. In 1883 the Council of Hygiene concerned themselves with it, and after several examinations, discussions, and reports approved, in 1881, the selection of one of the lofty portions of the cemetery of Père Lachaise as the site of three crematory furnaces. These furnaces were to serve for experiments and the destruction of bodies which had already been used for anatomical purposes. On the 27th of July, 1885, the Municipal Council approved the construction of a funerary building, with apparatus for cremation, and authorized the immediate execution of that part of the project necessary for the incineration of refuse from the hospitals, which reach a total of about three thousand bodies a year on the average. Finally, on March 30, 1886, the Chamber voted by a large majority, freedom of choice for every individual of full age between burial and incineration in his own case.

The design adopted has a monumental aspect, and the general appearance will be very imposing. The authorities have felt that to the first device of this kind erected in France there should be given such character as to make an impression on that portion of the public which feels repugnance for this system of destroying corpses. The estimate of cost was 629,274 francs. The architect of the Ville de Paris, M. J. Formigé, was the one charged with its construction. It consists of a ground-floor with vaulted galleries, whose use is not yet absolutely fixed upon. This ground-floor will form the sub-basement. Above will be the rooms that are intended for the public. The annexed plan gives the arrangement of the first story. A large central hall covered by a dome and surrounded by large galleries, terminates in three hemicycles, each of which is to contain a crematory furnace. This story will be reached either by a grand incline of gentle slope or by staircases. These details are still to be studied. The part actually built contains only the three hemicycles which enclose the furnaces, only one of which has been installed up to the present time — a furnace of the system Gorini, adopted in Italy, built of brick, and arranged as the annexed section shows. The hearth F at the level of the ground-floor is fed with wood. The flame, stimulated by a strong draught mounts in the chamber, licks the body lengthwise, and descends to the entrance of the chimney-shaft T. The body is placed on a dish of sheet-iron and covered with asbestos cloth. This dish, running over a system of rollers and dragged by a chain which crosses the furnace, is thus introduced into the chamber. The material now used is only experimental. It has certain inconveniences. The sheet-iron dish, subjected to the great heat of the furnace, yields rapidly. The one which I saw, and which had only been used for two

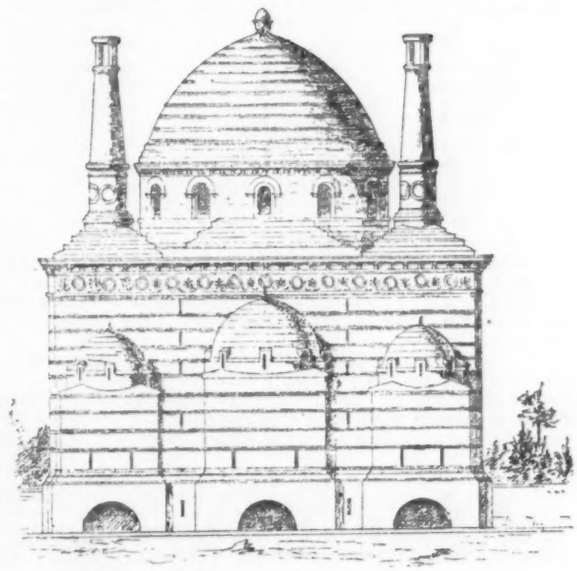




experiments, was already warped and covered with scales. When the arrangements are finally completed they will be compelled to use everywhere that may be possible apparatus made of infusible clay. It is likely, too, that the system of Gorini will be replaced by that devised by Siemens, which employs gas, and is far superior; but still it was interesting to observe that already good results were obtained with the system of Gorini.

Three or four hundred kilogrammes of wood were needed for the incineration of a single body. The flame traverses the furnace as I have described, and gas and fumes disappear up the chimney-flue. To prevent any dangerous gases, given off during combustion of the body, from vitiating the surrounding atmosphere, a grate fed with coke is fixed at a certain height in the chimney-flue. The putrid gases are burned while passing through this fire, which serves at the same time to accelerate the draught of the main furnace. Experiments made at the mouth of the chimney upon the gases which are delivered from it have shown that in point of view of hygiene they no longer contain any deleterious principles. Experiments made on the 15th of December before some members of the Academy of Medicine and the Municipal Council, and at which I was present as correspondent of the *American Architect*, gave the following results: The average time required for the incineration of the body is one hour and three-quarters and upwards in a furnace raised to the temperature of six or seven hundred degrees [centigrade]. The resulting relics were some fragments of bones resembling pumice-stone and very friable. The portions upon which the fire had the least effect were the teeth, vertebræ, the hip-bones, as well as the joint of the tibia and the thigh. These fragments weighed about two kilogrammes.

I enclose a sketch of the rear elevation of the monument as it was



first arranged by M. Formigé. In execution certain modifications have been introduced. The chimneys have been brought in between hemicycles, as is indicated upon the plan, which is exact. The architect, by employing bands of black stone, has secured a decorative effect very much in keeping with the character of the building.

The estimated expense of the portion actually built was 245,975 francs, and up to the present time it has not reached the sum of 200,000 francs.

This building, when it shall be complete and crowned by its dome, will surely have an imposing air still more enhanced by the columbarium already projected, in which will be arranged niches for the reception of funerary urns: this columbarium will surround the furnace-building proper. But it will probably be a long time before the practice of cremation becomes a matter of daily occurrence: already it has encountered numerous adversaries, who attack it from different points of view, one of the most serious of which is the impossibility in criminal cases of deriving proof from autopsies. Cremation will be under the control of regulations, whose discussion will consume much time in a country where different societies and commissions play so important a rôle, and where the least undertaking gives rise to such numberless reports. More than this, it will be necessary to overcome the violent opposition of the Church and the deeply rooted prejudices of the people.

During the month of December took place at the Gallery Durand-Ruel the exhibition of paintings, pastels and drawings of Puvis de Chavannes. It was interesting to see here brought together the different works of this artist, so unequal, and so unequal in a wholly voluntary fashion. This, at any rate, is the notion which naturally comes to you when, at the side of his magnificent drawings in red chalk, so solid, and recalling as they do those of the greatest masters, you find compositions of such poverty and such slip-shod drawing.

M. Puvis de Chavannes has his admirers, who follow him everywhere, and sustain him through thick and thin. These admirers have the audacity to try to make us understand and appreciate, for example, "The Poor Fisherman," that absolutely bad painting of the *Salon* of 1881. I am free to say that they will have their trouble for their pains. Fortunately, M. Puvis de Chavannes, who is an artist of distinguished worth, has done other work upon the merits of which everybody is agreed, and several of his decorative paintings are very fine. They have in every case that soft color which is so harmonious and goes so well with architectural surroundings. All the same, there is need of an architecture of peculiar character, antique and solemn, for M. Puvis de Chavannes does not vary his style. It is grand in sentiment, but always a little mystic. There is need of the grand, calm lines of religious or academic architecture to put his talent at ease with itself and produce its best results. His paintings at the Panthéon are magnificent, and we have seen with pleasure the reduction. The same may be said of the paintings for the Museum at Amiens — "Repose," "Labor," "War" and "Peace." These four compositions are superb. This is truly grand decoration. They are well grouped, and vie in color and drawing. The studies made for them in red chalk are superb.

I will mention once more the "Women on the Sea-Shore" (they were shown at the *Salon* of 1879), which has a graceful movement and an agreeable tone. The reduction of a large painting, "Autumn," is very pretty and decorative; a fine nude torso in pastel, and the very beautiful and the very pure drawings for the mural paintings of the stairway of the Hôtel de Ville at Poitiers "Radegonde in the Convent of St. Croix," and "Charles Martel victorious before Poitiers," and finally some figures for his beautiful mural paintings on the Staircase of Honor at the Palace of Longchamps at Marseilles, and that for the Museum at Lyons. What difference between "The Young Mother," harsh in drawing, "The Prodigal Son," *Salon* of 1879, and "The Decapitation of St. John the Baptist," from the *Salon* of 1869, which the partisans of M. Puvis de Chavannes nevertheless count among his fine paintings. This one lacks air and is disagreeable in color. I do not care much more for his figure of "Hope," which hung at the *Salon* of 1872, in which I find, nevertheless, a background which is perfectly ravishing.

Finally, must we admire the great canvas styled "Sleep," which is little known, the artist having kept it in his studio since the *Salon* of 1867, to which he had sent it? The composition is not good. A group of persons asleep occupy the right of the painting. This group is confused and too crowded; other personages sleep in isolation on the left. There is no bond in the arrangement, no *ensemble*, but on the horizon above the sea arises an enormous half moon. It lacks sentiment, and it is impossible for me to discover in this work that poetic and tender conception, which some of the privileged pretend to discern there.

In spite of these inequalities the exhibition was interesting, for M. Puvis de Chavannes evidently must be counted among our masters of decoration. He is an artist of originality and conscientious, whose name is attached to magnificent works, and who has that conviction and veneration for art which have always a right to our respect.

THE ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

CHURCH OF ST. JOHN THE BAPTIST, QUEBEC, CANADA. MR. J. F. PEACHY, ARCHITECT, QUEBEC, CANADA.

[Gelatine Print issued only with Gelatine and Imperial editions.]

"GREENE'S INN," NARRAGANSETT PIER, R. I. MR. WM. GIBBONS PRESTON, ARCHITECT, BOSTON.

THIS building is the result of an effort to produce a hostelry promising some of the creature comforts so commonly found in the smaller hotels of England and which the great caravansaries lining our coast are the farthest possible from furnishing. In addition to being a noted and delightful summer resort, Narragansett Pier, like Newport, has a mild and bracing winter climate, owing to the proximity of the Gulf Stream, and it is the intention of the owners to offer an attractive and comfortable house for invalids or others desiring a change from their home life without the necessity of a journey to Old Point Comfort, for example. Hence the *Solarium*, which is on the south-east corner and is a great glazed piazza, with sashes removable, shingled within, a fish-net covering the ceiling and containing a wide, open fireplace built of field-stones and beach cobbles. In summer the sashes can be removed and the Solarium will then form part of the front veranda. A former building will be used for kitchen, laundry, etc., and during the winter the large dining-hall will be disused and the smaller south dining-room take its place. Chimneys, foundations, etc., are of field-stone; walls shingled; belt above Solarium, mortar on wire lathe, with scratched design.

THE PARIS OPERA-HOUSE, AFTER AN ETCHING BY J. A. MITCHELL.

John Ames Mitchell was born in New York in 1845. He studied architecture at the École des Beaux-Arts from 1867 to 1870, and then practised his profession in Boston for six years. During this time he built a church in North Easton, Mass., a library at Randolph, Mass., a church in Halifax, N. S., and many houses. In 1876 he again went to Europe and studied painting in Paris under Lefebvre and Boulanger, and etching with Brunet-Debaines until 1880. He then returned to New York and in 1883 founded *Life*, the well-known comic journal of which he has since been editor.

In addition to the "Paris Opera House," which we reproduce by the kind permission of M. Rouam, the publisher of *L'Art*, Mr. Mitchell has produced the following etchings: "The Door of a Church at Châteaudun" (from a drawing by Brunet-Debaines); "The End of the Act"; "A Political Marriage" (from his own painting), and ten sketches of the Paris Exposition of 1878.

Looking at the many merits of the admirable plate before us — its sense of light and space, the well-rendered types of Parisian life in the foreground, and the exceedingly clever drawing of the architecture — one wishes that Mr. Mitchell had given us more work in this direction and that the products of his art were not confined now to an occasional bright drawing in the pages of *Life*.

Ten years ago when this print was made, but little had been done of the mass of brilliant work which we can now point to as the production of American etchers, and if the "Paris Opera House" has since been equalled as an architectural etching by an American artist, it has certainly not been surpassed.

BUSINESS BLOCK DESIGNED BY MR. A. B. STURGES, CLEVELAND, O.

PART OF THE FACADE OF THE UNIVERSITY, SALAMANCA, SPAIN.

THE HOLBEIN MADONNA.

CAPITAL FROM DEERHURST CHURCH

AMONG the events of the year just ended, there was none so important to the credit of art-criticism as the identification of the Darmstadt Madonna, through the cleaning of the painting by Hauser in Munich.

The public acceeds to the superior general knowledge of professional critics, but that insight of connoisseurs as to this touch of the brush having been made or not made in this or that century by this or the other master is felt to have no substance, or a substance so very superfine as to irritate robust common sense. So, too, with this old controversy as to whether the Madonna in Darmstadt or that in Dresden is the original by Holbein.

Americans know the picture. In the Dresden gallery it is the only painting besides the Sistine Madonna of Raphael that has a room almost to itself, and it has belonged to the collection for over a century. All the world valued it as having been from its origin the most renowned work of Holbein, and the masterpiece of Classic German art, just as Raphael's Madonna is of Italian art. When a second picture turned up and critics claimed that it and not the Dresden one was the famous original, the world was impatient enough at their cavilling. Curiously, however, after having gathered proofs from history (the Darmstadt picture can be traced back with tolerable connections through many hands, whereas there is a great gap in the past of the Dresden one), from the looks, the technique of the picture, from its old frame (which was stamped with the coat-of-arms as was claimed of one of Burgermeister Meyer's kinsmen), they have now been proved right by the texture, so to speak, of the picture.

Holbein's painting was finished in Basle in 1526, shortly before his journey to England. It had been ordered by the Burgermeister

Hans Meyer — one tradition says to show his attachment to the Church at a time when Protestantism was becoming the vogue in Basle, and another as an offering of thanks to the Virgin for having cured the lame left arm of his sickly baby. The whole family are grouped before the Madonna, the Burgermeister, his two sons, his wife with her daughter Anna, and his dead first wife. The mantle of the Virgin spreads itself protectingly towards the group, and the child on her left arm stretches his hand over it. What has always made the picture so renowned is its wonderful domesticity of air. The Madonna with her blond almost imperceptible eyebrows and floating blond hair is stiff; but her stiffness, her passive mildness and imperfect grandeur answered exactly, one felt, to the ideal of the Virgin in the mind of this lumbering, brave, honest-souled Burgermeister, who looks up to her with folded hands and ardent childish expectancy.

It was the one Madonna in the world that spoke, in spite of its old-fashionedness, to the Germanic heart of respectable, family, everyday piety. Raphael's Madonnas have a grace that is poetic; Murillo's are dark-eyed girls of half gipsy blood — they convey no sense of well-ordered family life; and as for Van Eyck's and Durer's, they have too much gold drapery and state. Connoisseurs marvelled at the solidity of the painting, the life-likeness of the personages, the perfect mastery of anatomy and grouping.

The first striking difference between the Dresden picture and the new one that had been brought by Spontini for his brother-in-law, the Paris art-dealer Delahaute, to Berlin, and sold to Prince Wilhelm, was that the Madonna in the latter is pressed closer under the niche, and the Burgermeister's family closer to the Madonna. It was later that minuter differences were detected; in fact all came to light for the first time when the two paintings were exhibited side by side in Dresden in 1871. Then it was seen that the Darmstadt picture is fuller of warmth and life. The well-known critic Kugler, had pointed out that the shadows in the Dresden Madonna's neck are not of the carnation tone which Holbein loved; now others saw that the parted lips of the elder son are wooden, that the gold crown of the Virgin and the hair of all the personages are thinly laid on, that the black lines of the embroidery on the white dress of the young girl are unevenly drawn, and the carpet roughly drawn in comparison with the Darmstadt picture, and that the whole coloring is more insipid. The English authority, Wornum, of the National Gallery, declared once for all that in his judgment Holbein had never laid a hand on the Dresden picture; and Woltman, the most learned Holbein connoisseur in Europe, wrote with fervor to similar effect.

Among the sketches of Holbein studied by Woltman, there exist studies for this picture of the Meyer Madonna. In these the heads of both women are wrapped about with a cloth, according to a fashion of the times and a custom still existing in some parts of Germany; and the daughter Anna has floating hair. On both pictures, her hair is in a net, and only the head of the dead first wife is bound in a chin-cloth. The Darmstadt painting won powerful support when it was found that under the outer layer of paint there are perceptible earlier lines representing floating hair.

But in spite of these proofs and others, habit has been a heavy weight on the side of the Dresden picture. It was the old, well-known one; too many had praised it to give over without further ado. Besides there were certain unanswerable points, as that of the insipid smile of the Darmstadt Madonna, which was so wholly unlike Holbein.

What is the excitement now and earnestness when the Darmstadt painting has been cleaned, to discover that it was not merely covered with a thick, disadvantageous varnish, but that whole portions had been painted over — more portions than any critic has claimed. Hauser removed the overlays of paint, as well as the varnish: not the layer over the floating hair of the girl and the chin-cloth of the wife of Meyer; these are solid impasto, equal in age with the rest of the painting; but the superficial layers. It comes to light that the Madonna's nose had been made straight by these, her original indescribable expression of mildness and majesty disfigured by a smile drawn in her cheeks, and the profile nose of the daughter Anna made straight and shorter. The last points, in short, that told against the picture, have fallen away; it is granted to be the original, and its worth has risen from twenty thousand to a million thalers.

COUNTESS VON KROCKAU.

AN ANCIENT MEXICAN CANAL UNCOVERED. — The Riverside (Cal.) *Press* reports H. J. Stephenson, surveyor of the Palm Valley Water Company, as making a singular discovery while surveying the canal line running south and easterly from the old Agua Caliente Springs. "He had run one line on a grade of four feet to the mile from the present terminus of the stone canal to the new town site, but in crossing a depression near the mountain it would become necessary to build a quarter of a mile of fluming. In order to obviate this expense, he was instructed to make a new survey on a grade of eight feet to the mile, so as to strike the town site at a lower level and cross the depression without a flume. On this last survey, after crossing the depression in good shape, he struck an old canal that must have been used centuries ago, for large trees had grown up in the very bottom of the canal, and the indications were that when used it carried a very large volume of water. The most singular thing about the canal was that the surveyors found it just where they wanted to construct the new canal, and, in following it up for a distance of about a mile, it was found to have a regular grade of about eight feet to the mile."

FOURTH ANNUAL REPORT OF THE BUREAU OF ETHNOLOGY.[1] — II.

STUDIES IN POTTERY, BY WILLIAM H. HOLMES.

Fig. 303.

MR. WM. H. HOLMES, who contributes three important studies in pottery, is the artist in charge of the illustrations for the publications of the Bureau of Ethnology, and is honorary curator of the pottery collections in the National Museum. He has thus had excellent opportunities for the study of ceramics and, moreover, unites with high artistic talent a mind well trained in careful scientific observation. The first of his three papers relates to the more ancient groups of Pueblo pottery in the National Museum collections, considered under the heads of coiled, plain and painted wares. As Major Powell remarks editorially, "He has used the information in his possession to elucidate the processes by which culture has been achieved and the stages through which it has passed. It is to be noted, however, that the Pueblos were sedentary and thus practised ceramic art continuously for a long period; also that in their arid country there was special need of vessels for the transportation and the storage of water." Major Powell justly points out that in the illustrations some designs will attract attention from their resemblance to the most exquisite patterns of Classic art and Oriental decoration, with which they will bear favorable comparison. "The special feature of this paper is that it explains more fully than has been explained before, with practical examples, the development of geometric ornamentation. It is shown that forms of decoration, originating in the previously existing textile art and hence purely conventional, were imposed upon the potter's art, which, at the time of the Spanish conquest had not yet acquired a style purely its own."

Among the copious and beautiful illustrations, to show Mr. Holmes's method of study, we may select four examples drawn from one specimen, a dipper from the ancient province of Tusayan in northeastern Arizona. These give a good idea of the nature of the methods of design among the ancient Pueblos. First, in Figure 302, we have the engraving of a dipper reduced to one-third the size of the original. The handle is plain and terminates in a horizontal loop. The painted design is not arranged about a square, but leaves a space in the centre of the bowl resembling a four-cornered star. "This shape is, however, the result of accident. The four parts are units of an elaborate border, not severed from their original connection, but contorted, from crowding into the circular space. The design drawn

Fig. 310.

upon a plain surface is shown in Figure 303. Projected in a straight line, as in Figure 304, it is readily recognized as the lower three-fourths of a zone of scroll ornamentation. A unit of the design drawn in black is shown in Figure 305. The meander is developed in the white color of the ground, and consists of two charmingly varied threads running side by side through a field of black, bordered by heavy black lines. The involute ends of the units are connected by two minute auxiliary scrolls."

Another beautiful example is that of the vessel from the same province presented in a reduction of one-half in Figure 310. It has a flattened upper surface, an angular shoulder and a high body, slightly conical below. "The painted design is nearly obliterated in places by abrasion or weathering, but is correctly presented in Figure 311, which gives the three zones in horizontal projection. This brings out a very marked feature, the cruciform arrangement

[1] Continued from No. 629, page 21.

of the parts, which would not be apparent in a vertical projection. The two inner circles occupy the upper surface of the vessel and the outer one the most expanded portion of the body. The inner belt is separated into four panels or compartments by as many series of

transverse lines, the panels being filled in with longitudinal broken lines. The second band is also divided by four series of straight lines, but the compartments are occupied by scrolls in white, bordered by serrate wings in black. The outer band exhibits a very curious combination of features, the whole figure, however, being based upon the meander. It is probable that the grouping in fours is accidental, the division of a surface into four being much more readily accomplished than into any other number above two."

In this conjecture about the reason for the grouping in fours, Mr. Holmes is probably mistaken, since four is a number of peculiarly-sacred significance among the Indians. They use it in the same way that we, in our Aryan race, are habituated to use the number three, as, for instance, where in starting in upon a physical contest of any kind we would naturally exclaim: "One, two, three, go!" an Indian would invariably say: "One, two, three, four, go!" In formal preliminary repetitions, also, as in relating a folk-tale, they repeat four times, as we are accustomed to three. The reasons for these adoptions of different numbers would probably have to be sought far back in the early days of the respective races.

Fig. 304.

In conclusion, Mr. Holmes has a word to say about the origin and character of the leading decorative conceptions: "Glancing through the series of vases illustrated under painted ware, we find that ninety-four out of one hundred designs are meanders or are based upon the meander. Beginning with the simple waved or broken line, we pass up through all grades of increasing complexity to chains of curvilinear and rectilinear meanders, in which the links are highly individualized, being composed of a signoid line terminating in reverse hooks, but in no single case do we reach a loop in the curved forms or an intersection in the angular forms. The typical intersecting Greek fret does not therefore occur, nor, I may add, is it found anywhere in native American art. The constructional character of the art in which these linear forms developed, although they encouraged geometrical elaboration, forbade intersections or crossing of a line upon itself, and the genius of the decorator had never freed itself from this bondage. The forms imposed upon decoration by the textile art are necessarily geometric and rectilinear, and their employment in other less conventional arts has been too limited to destroy or even greatly modify these characters. The study of Pueblo art embodied in the preceding pages tells the simple story of the evolution of art — and especially of decorative art — in a period when the expanding mind of primitive man, still held in the firm grasp of instinctive and traditional methods — the bonds of Nature — was steadily working out its æsthetic destiny."

Mr. Holmes's second paper, upon the ancient pottery of the Mississippi Valley, is an important contribution to that branch of the general subject under discussion, but for the present we must content ourselves with a quotation from Major Powell's editorial remarks and pass on to a consideration of the paper on the origin and development of form in ceramic art. Says Major Powell: "A prominent feature is the great diversity of form, indicating the long practice of the art, a high specialization of uses and considerable variety in the originals copied. The manual skill was of a fair order, and symmetry of form, combined with grace of outline, was achieved without the use of the wheel. The rank of this ware is higher in these respects than that of the historic pottery of Central and Northern Europe, though inferior to that of Mexico, Central America and Peru. In characterizing the degree of culture represented by this ware, Mr. Holmes decides that there is no feature in it that cannot reasonably be attributed to the more advanced historic tribes of the valley where it is found. It indicates a culture differing in many particulars from that of the Pueblo Indians, ancient or modern, but, on the whole, is rather inferior to it."

Mr. Holmes's third paper is brief, but highly suggestive. We cannot do better than reproduce Major Powell's characterization: "The prominent feature of the present paper, which combines the results of the three former papers, the first of which, "Prehistoric Textile Fabrics of the United States derived from Impressions on Pottery," appeared in the Third Annual Report, is that it presents the evolution of form and ornament in the ceramic art and suggests the same evolution in all other developments of art. The course of development here, as elsewhere, is shown to proceed from the simple to the complex, and the causes and processes of the developments are explained, analyzed, classified and illustrated from examples never before presented. The accessible material on the subject shows that in America there is opportunity for the study of the origin of art beyond any hitherto enjoyed in the Eastern Hemisphere. In the order of evolution, the character of the specimens now under examination ends where Classic art begins, and though the recent discoveries by Schliemann and others have brought to notice the lower archæological substratum of the East, its productions are few and meager compared with the multitudes of representative objects of the same general character already in the National Museum. These now open to the student the advantage of a method which examines into the beginnings of art in reference to form and ornamentation, as well as into the earliest traces of manufacture or construction and of function, which show a widely different evolutionatory line."

The foregoing remarks are to be commended to the attention of those devotees of Classic archæology who can see nothing in the American field worthy of æsthetic consideration. They must be blind indeed if they cannot now perceive the important bearing which studies on American ground have upon a correct understanding of the results of the explorations conducted upon the historic soil of the Old World.

In the present paper, Mr. Holmes confines himself to the geometric side of the study. The important results already obtained cause us to give a doubly hearty welcome to the announcement that he is preparing a monograph on a comprehensive basis. Major Powell deduces the important general observation from the subject, as now presented, that no metaphysical law of beauty is to be ascertained: "The æsthetic principle is not to be found directly in or from Nature, but is an artificial accretion of long-descended imitations of objective phenomena. Objects are not made because they are essentially pleasing, but are actually pleasing because they have been customarily made. The primitive artist does not deliberately examine the departments of Nature and art and select for models those things which are most agreeable to an independent fancy, nor even those which simple reason would decide upon as most convenient. Neither does he experiment with any distinct purpose to invent new forms. What he attempts in improvement is what happens to be suggested by some preceding form familiar to him. Each step is not only limited, but prescribed by what he already possesses in nature or in art, and, knowing his resources, his results can be closely predicted. On the other hand, knowing his products, much can safely be predicated of his environment and past stages of development."

Major Powell shows a fine discernment in these words. Many a thoughtful student of æsthetic principles has reached certain conclu-

sions in this regard. Habit has a powerful influence in the formation of a standard of what is commonly called the beautiful, and that this standard varies according to conditions of time and place

is shown by manifold observations. The power of one of the most fickle influences of our modern life, the influence of "fashion," strongly reinforces the remark that objects are pleasing because they are customarily made. Forms of personal ornament which, should they appear suddenly upon the street, would be received with derision and would often be sufficient to raise a mob because of their unwontedness, become by usage in a very short time endowed with the equivalent of beauty in the eyes of the multitude. But here a distinction should be drawn between the pleasing and the beautiful. To the truly artistic eye the cylinder hat, the big bustle and the like will ever remain hideous objects, however familiar custom may make them. To the multitude, however, with the æsthetic faculty undeveloped, the unwonted is displeasing. This may be seen in the matter of what we call learning to like certain articles of food, when through a desire to conform to the habits of our fellows, we force ourselves to find pleasure in what was originally repulsive to us. And how disgusting a certain viand is made if we unexpectedly find it imbued with the flavor of some other viand, no matter how pleasing the latter may be to us in itself. Is not this principle at the base of what we call "a cultivated taste," even in the broadest sense of the term? And may not even pain arise from the misapplication of the same sensation that produces pleasure?

While there may be no absolute standard of beauty, it seems as though there might be an intrinsically existing beauty quite apart from what is ordinarily pleasing. With persons in whom the feeling for true beauty resides the faculty appears to be intuitive, and quite independent of custom or fashion; based on those divine laws of proportion, affecting the perceptions in harmoniously adjusted relations, and making music, in the Classic and highest meaning of the word, for whatever sense to which the producing cause may be addressed. And these relations, must of necessity have a strictly mathematical origin, causing pleasurable sensations by series of vibrations rythmically affecting the nerves of perception. This must be the action of that rule of "the Golden Cut," which is said to lie at the base of structural beauty, and the existence of which enables us, for instance, without knowing exactly why, to tell whether architectural work is well designed, or no.

The advantages of the American field of archæological research in comparison with the favorite fields of the Old World are shown by Mr. Holmes's remark that the dawn of art in those countries lies hidden in the shadow of unnumbered ages, while ours stand out in the light of the very present. "This is well illustrated by a remark of Birch, who in dwelling upon the antiquity of the fictile art, says that 'the existence of earthen vessels in Egypt was at least coeval with the formation of a written language.' Beyond this there is acknowledged chaos. In strong contrast with this is the fact that all pre-Columbian American pottery *precedes* the acquisition of written language, and this contrast is emphasized by the additional fact that it antedates the use of the wheel, that great perverter of the plastic tendencies of clay."

Mr. Holmes finds in ceramic art two classes of phenomena of importance in the study of the evolution of æsthetic culture, relating, first to form and second to ornament. No form, or class of forms, he maintains, can be said to characterize a particular age or stage of culture, though, in a general way, of course, the vessels of primitive people will be simple in form, while those of more advanced races will be more varied and highly specialized. The shapes first assumed depend upon the shape of the vessels employed at the time of the introduction of the art and upon the resources of the country in which they live. This is illustrated as follows: "If, for instance, some of the highly advanced Alaskan tribes which do not make pottery should migrate to another habitat, less suitable to the practice of their old arts and well adapted to art in clay, and should there acquire the art of pottery, they would doubtless, to a great extent, copy their highly developed utensils of wood, bone, ivory and basketry, and thus reach a high grade of ceramic achievement in the first century of the practice of the art; but, on the other hand, if certain tribes, very low in intelligence and having no vessel-making arts, should undergo a corresponding change of habitat and acquire the art of pottery, they might not reach in a thousand years, if left to themselves, a grade in the art equal to that of the hypothetical Alaskan potters in the first decade. It is, therefore, not the age of the art itself that determines its form, but the grade and kind of the art with which it originates and co-exists."

Ornament is found to be subject to similar laws. "Where pottery is employed by peoples in very low stages of culture, its ornamentation will be of a simple archaic kind. Being a conservative art and much hampered by the restraints of convention, the elementary forms of ornament are carried a long way into the succeeding periods and have a very decided effect upon the higher stages. Pottery brought into use for the first time by more advanced races will never pass through the elementary stage of decoration, but will take its ornament greatly from existing art and carry this up in its own peculiar way through succeeding generations."

The author considers the possible origin of form as by adventition, by imitation of natural and artificial models, and by invention. He finds a key to unlock many of the mysteries of form in the observation that clay is so mobile as to be quite free to take form from surroundings, and where extensively used will record or echo a vast deal of Nature and of co-existent art. A number of most convincing illustrations are given to show the derivation of pottery forms from various sources, as from vessels of stone, bark, wood and basketry. In Figure 465, for instance, we have a form derived from a natural object, the vessel of clay being a palpable imitation of the conch-shell. A remarkable example of coincident forms is to be seen in Figure 473, showing how the contact of a nation of potters with a nation of carvers-in-wood would tend very decidedly to modify the utensils of the former. Here we have first, in *a*, an Alaskan vessel carved in wood. "It represents a beaver grasping a stick in its hands and teeth. The conception is so unusual and the style of vessel so characteristic of the people that we should not expect to find it repeated in other regions; but the ancient graves of the Middle Mississippi Valley have furnished a number of very similar vessels in clay, one of which is outlined in *b*. While this remarkable coincidence is suggestive of ethnic relationships which do not call for attention here, it serves to illustrate the possibilities of modification by simple contact."

Mr. Holmes's consideration of the origin of ornament, as of that of form, are of extreme interest and suggestiveness for nearly all fields of depictive art. In the study of the evolution of ornament this important fact, concisely stated by the author, should be borne constantly in mind: "Elements of design are not invented outright: man modifies, combines and recombines elements or ideas already in existence, but does not create."

One of the most fruitful sources of pottery ornamentation are the suggestions afforded by constructional features of artificial utensils or objects whose forms serve as models. We may quote our author's remarks on the influence of basketry: "Of the various classes of utensils associated closely with the ceramic art, there are none so characteristically marked by constructional features as nets and wicker-baskets. The twisting, interlacing, knotting and stitching of filaments give relieved figures that by contact in manufacture impress themselves upon the plastic clay. Such impressions come in time to be regarded as pleasing features, and when free-hand methods of reproducing are finally acquired, they and their derivatives become essentials of decoration. At a later stage these characters of basketry influence ceramic decoration in a somewhat different way. By the use of variously-colored fillets the woven surface displays figures in color corresponding to those in relief, and varying with every new combination. Many striking patterns are thus produced, and the potter who has learned to decorate his wares by the stylus or brush reproduces these patterns by free-hand methods. We find pottery in all countries ornamented with patterns, painted, incised, stamped and relieved, certainly derived from this source."

In considering the development of fret-work and scroll-work, Mr. Holmes takes issue with the late Professor C. F. Hartt's theory, that the development of ornamental designs took particular and uniform directions owing to the structure of the eye, certain forms being chosen and perpetuated because of the pleasure afforded by movements of the eye in following them, and that, in unison with the general course of Nature decorative forms began with simple elements and developed by systematic methods to complex forms. "Let us turn to the primitive artisan," says Mr. Holmes, "and observe him at work with rude brush and stylus upon the rounded and irregular forms of his utensils and weapons, or upon skins, barks and rock-surfaces. Is it probable that with his free-hand directed by the eye alone he will be able to achieve these rythmic geometric forms? It seems to me that the whole tendency is in the opposite direction. I venture to surmise that if there had been no other resources than those named above, the typical rectilinear fret would never have been known, at least to the primitive world; for, notwithstanding the contrary statement by Professor Hartt, the fret is, in its more highly developed forms, extremely difficult to follow with the eye and to delineate with the hand. Until arts, geometric in their construction, arose to create and combine mechanically the necessary elements and motives, and lead the way by a long series of object lessons to ideas of geometric combination, our typical border ornament would not be possible. Such arts are the textile arts and architecture. These brought into existence forms and ideas not met with in Nature and not primarily thought of by man, and combined them in defiance of human conceptions of grace. Geometric ornament is the offspring of technique." SYLVESTER BAXTER.

BOOKS AND PAPERS

JACQUES ANDROUET DU CERCEAU[1] is a name which we fancy is not very familiar to the majority of our readers, though any one who has had an intimate acquaintance with a French atelier will recall the name in connection with a volume entitled "*Les Plus Excellents Bâtiments de France*," a work which is not only classical in French architectural history, but is also invaluable for the insight it gives into the architecture of the transitional period in French art. Du Cerceau might be called the apostle or almost the creator of the *style Henri II.* The exact date of his birth is so shrouded in conjecture that we can only assume that he was born some time before 1520. He visited Italy in 1531 as we know by some sketches of his which bear that date, and which seem to indicate that he was a stranger to Italian art up to that time. Du Cerceau was the first Frenchman, we believe, who went to Rome to study architecture, instead of going

[1] "*Les Du Cerceau, leur vie et leur œuvre, d'après de nouvelles recherches.*" par le Baron Henri de Geymüller. Paris: J. Rouam, Editeur.

to Milan or the northern Italian cities, after the manner of Jean de Bullant, Philbert de l'Orme and others who preceded him by a number of years. In Du Cerceau's time the Renaissance was just beginning to show itself. The influence of François I and his artists made the people somewhat acquainted with the nature of the movement which was taking place in Italy; but Du Cerceau can almost be credited with being the real founder of the French Renaissance. Certainly he did a great deal to give the new style a pure direction, as is seen by his numerous publications, and to popularize a taste for Italian ideas in art. His stay in Italy was not very extended as nearly as we can discover, but he was very much impressed by the works of Bramante and his school, and the creations of the Henri II period show how much he sought to follow in the steps of the illustrious architect of Saint Peter's. Those who are familiar with the Paris churches will remember that Saint Eustache was begun about the same time as Saint Peter's at Rome, and the construction of the two churches was carried on simultaneously. Du Cerceau prepared a very interesting scheme for the façade of Saint Eustache, and we believe it was partly carried out in the lower stories, though subsequently changed in the upper portions. By the sketches which he has left of his idea, it would appear that he aimed to produce a front after the style of the Palazzo Farnese Court-yard—a bold, severe Doric. We can easily imagine how Du Cerceau, fresh from the influence of Bramante, should endeavor to engraft the Italian ideas on the semi-Gothic stock. Still, one cannot altogether regret that Saint Eustache is no more pure than it is, for the mixture which now exists is thoroughly pleasing and picturesque.

Du Cerceau's actual work as an architect appears to have been very limited. Aside from the church and château at Montarges, we have no absolute record of his work, though judging from his notes it is reasonably certain that he was at least associated in the construction of the Château de Madrid and the Château de Verneuil; while among his drawings are several *projets* for portions of the Louvre, though it is doubtful if any of his designs for the Royal Palace were actually carried out. His general title to fame lies in his publications. Almost immediately upon his return from Italy, he became inspired with the desire to popularize throughout France a knowledge of Italian architecture in order to put his country in a condition to compete with Italy and the Italian artists, at that time, so numerous in France. He says himself of his works that they had for aim to "*servir à ceux qui sont curieux de l'antiquité, et encore plus (à mon jugement) à ceux qui sont maistres en l'architecture, lesquels y pourront trouver plusieurs beaux traits et enrichessements pour aider leurs inventions.*"

With these aims in view, he published during his lifetime so extended a series of works that it seems almost as if much that was attributed to him must have been the work of some other architect of the time, though his biographer submits very substantial evidence of the authenticity of all the works that are attributed to Du Cerceau. His volumes can be divided into three categories: first, works for painters or draughtsmen, in which the human figure plays the principal rôle; secondly, works relating to decorative art; and third, works devoted entirely to architecture. There are many things in the second group which are architecturally interesting, but the most valuable of his productions are comprised in the last category. Du Cerceau published successively books on "*Architectural Ruins*," including all the Roman antiquities which have since been studied so exhaustively by the French students; also a book on the "*Orders*;" another on "*Triumphal Arches*;" another on "*Fountains and Gateways*;" and an exceedingly valuable volume of architectural details, all of them purely Classical and taken directly from the old work. The work on the "*Grands Cartouches de Fontainebleau*" is also ascribed, with reason, to him. Besides these works, which have all to do more or less with Classical architecture as distinguished from the Renaissance, he published three large volumes dealing with "*Religious Monuments, Temples and Fortified Habitations*," which include the Renaissance work to a certain extent. But his best known work, the most valuable, both for itself as a document and for its relation to history, is "*The Most Excellent Buildings of France*," a collection of the best châteaux and palaces of the period, including many which have since entirely disappeared, and also including schemes and *projets* which were never carried out. The drawings were all made by Du Cerceau himself or by one of his sons, and are simply invaluable to any one who cares to study the French Renaissance. The work is almost too well known to need any mention.

Of Du Cerceau's manner as a draughtsman, M. de Geymüller gives us some details which would probably interest a student. Du Cerceau was obliged to work very rapidly in order to accomplish all that he did, for he engraved all of his drawings, besides making innumerable sketches which are scattered through the European collections, and especially in some of his later works we find him adapting many little tricks to expedite his drawing. For instance, when he drew columns in perspective, the ellipses of the capitals and bases were often replaced by arcs of circles, of which the centres were placed on the axes of the columns. In one very clever drawing of his series of "*Orders*," a column is shown surrounded with spiral flutings, each one of which is traced with two arcs of a circle, and sometimes he even replaced perspective ellipses by segments of circles. Of course, such processes did not add to the value of his work, still Du Cerceau was so immeasureably ahead of any draughtsman of his age, that we can easily see how he could have adopted such devices with a clear conscience. We remember being very much struck a number of years ago with the contrast afforded in an exhibition, where the original drawings of Michael Angelo, Bramante and Raphael for Saint Peter's at Rome were displayed together with very clever architectural sketches by some modern French draughtsmen. The contrast was the more striking in that the ideas in the first case were so good, and in the second so poor; while the execution of the old masters was almost ridiculous as to technique, and the sketches of their modern descendants were absolutely perfect. The same contrast is suggested by a perusal of Du Cerceau's works, and one cannot but question whether what we have gained in technique has not implied a loss in ideas. Du Cerceau's personal sketches are scrawly, ill-drawn and misshapen, but the ideas are there every time, and the sketch means something; each line shows that the artist thought a great deal more than he drew. It is exactly this quality which makes Du Cerceau's work so valuable. Much of it is, of course, foreign to the present needs, but through it all we can see the imprint of serious thought; and it may be well questioned whether a return to some of the feeble methods of drawing might not be for the good of our architectural students of to-day, provided it could be combined with a corresponding return of freshness of ideas.

Du Cerceau was one who influenced more than he created, in which respect he may well be compared to his modern successor, Viollet-le-Duc. Du Cerceau certainly exerted an enormous influence on his contemporaries, and moulded the art-thought of his time into the lines, which in later years developed with such strength of architectural thought. It is interesting to know that Du Cerceau, in common with his illustrious co-worker, Jean Goujon, was a Protestant, but more fortunate than the sculptor he escaped the Saint Bartholemew massacre, and was even protected by Catherine de Medici, to whom he dedicated some of his works.

M. de Geymüller in this biography has accomplished, what no one but a Frenchman could have done, giving us the details of his life, character, works, surroundings and influences down to the very last supposition, even taking up his heirs and descendants to the tenth generation. The work is prolix in the extreme, and were it not for the admirable illustrations to the number of 128, that are scattered through the volume, it would be such as no one but a book-worm would ever care to seek for. The pictures tell the story just as Du Cerceau's own publications gave the key to his life.

SOCIETIES

NEW YORK CHAPTER OF AMERICAN INSTITUTE OF ARCHITECTS.

AT a regular meeting of the New York Chapter of the A. I. A., held January 11, the following officers were unanimously elected:

President, E. H. Kendall; Vice-Presidents, Geo. B. Post, C. W. Clinton; Secretary and Treasurer, A. J. Bloor. Standing Committees (the President and Secretary being *ex-officio* members of each): Executive, N. Le Brun, F. A. Wright; Library and Publication, Jas. E. Ware, Theo. de Lemos, H. O. Avery; Examinations, N. Le Brun, R. M. Upjohn, R. M. Hunt.

The following reports were submitted and accepted:

To the N. Y. Chapter, A. I. A.:

. . . . . .

Mr. Le Brun, the chairman of your committee on examinations, and *ipso facto* the representative of the Chapter in the Board of Examiners of the Building Bureau of the New York Fire-Department, was, with his colleagues of the board, invited by the commissioners of that branch of the municipal government to unite with them in joint committee for the purpose of suggesting amendments to the New York building-law with a view to perfecting the same and presenting it to the Legislature for enactment. The invitation was accepted, and on the organization of the joint committee the chairman of your committee on examinations was elected its chairman and the Hon. Elward Smith its secretary. This joint action resulted in the presentation of two reports, one in the interest of good building and the retention of the influence of the Chapter toward that end, the other more in the interest of speculative builders and calculated to minimize the professional and ameliorative influence of the Chapter. The better influence prevailed, however, and the building-law, though still not everything that is to be desired, received distinct improvements. To those familiar with the history of the building interests of New York under the municipal government, the gradual and of late marked improvements in the methods and *personelle* of that branch of it having those interests in charge, is very apparent. Your committee on examinations, during the twenty years of its existence, has, it may be conceded, fairly earned some portion of the credit for extending the growth of a faithful professional animus in this branch of the city government, contrasting strongly with the old-time prevalent spirit of mere self-seeking political placemen, frequently incompetent—at least in the lower grades of service—to the proper performance of the duties attached to positions in public employ, and bringing undeserved discredit on competent and conscientious fellow employés.

And in view of the immense importance of the interests in question, involving, as they do in large measure, the æsthetical environments, the sanitary conditions and the comfort and safety of the homes and the public places of worship, of justice, of business, and of recreation of two millions of people, at an enormous annual expenditure — nearly seventy millions of dollars having been spent during the past year in building operations within the city limits — this improvement is something on which the public, as well as the municipality, may well be congratulated.

Respectfully submitted,

N. LE BRUN,
A. J. BLOOR,
R. M. UPJOHN.

Welles Building, 18 *Broadway, N. Y.*,
January 11, 1888.

To the N. Y. Chapter, A. I. A.:

Your Executive Committee for the year 1886–87, as soon as it entered office, found itself confronted by the financial problem of how the Chapter should find the means to entertain the Twentieth Annual Convention of the Institute, which was due in this city on December 1 and 2, 1886. For many years, when a convention of the Institute has met in centres where a chapter exists, its members have been treated as the guests of that chapter, and it was now the turn of our chapter to reciprocate the hospitalities of many occasions. But the small revenue derivable from the dues of its members is necessarily absorbed in current expenses. The matter was finally referred to the committee of arrangements appointed by the Board of Trustees of the Institute, namely, Messrs. Littell and Hatfield, and the president and secretary; and after much painstaking on their part, and the issue of several circular letters, the handsome sum of seven hundred and twenty-one dollars was received from the members of the chapter and from four members of the Institute not members of the chapter. This amount enabled us to give our guests the handsome entertainment at which most of you assisted, and left a small balance over.

. . . . . .

Your committee desire to call your attention to the fact that at the twentieth convention of the Institute the special committee appointed to review the reports of the various chapters called the attention of the Institute to the statement that some of the chapters attributed their current success to the fact that their meetings were carried through on social lines, the business being preceded by a dinner, after the labors of the day were ended; and the special committee expressed it as their opinion that if this system were followed by other chapters it would have a good effect. The older members of the chapter will remember that these lines were partially followed by it for a number of years, the midday meetings being preceded by a light lunch. The result was, on the whole, tolerably successful, but a moiety of the members was in favor of evening meetings, and the custom fell into desuetude. It is a question whether it might not be revived with good effect in the shape of dinners after the professional labors of the day and preceding the chapter business. But here again the financial element comes in. Your committee, however, think that the subject might well be made the question of a succeeding meeting. Respectfully submitted,

EDWARD H. KENDALL,
RICHARD M. UPJOHN,
N. LE BRUN,
A. J BLOOR.

Welles Building, 18 *Broadway, N. Y.*,
January 11, 1888.

To the N. Y. Chapter, A. I. A.:

Your Committee on Library and publications for the year 1886–87 have only to report that the books and photographs of the chapter library have received during the year perhaps somewhat less than the average share of inspection and use from members and students. The most notable instance of the employment of the photographs was the borrowing by the Architectural League of New York of twenty-five examples from the Gambrill collection for use in the League's highly creditable exhibition in the Kurz Art Galleries, followed since by their very recent and even more admirable one in the Ortgies Art Galleries.

There is a law of the chapter that none of its contents shall be allowed to be taken from its library and reading-room, and this regulation, notwithstanding being frequently urged to overlook it, your secretary and librarian has always rigidly respected. But on this occasion he thought he would not only best meet the desires of the lamented collector and munificent donor of the Gambrill collection, but also best subserve the beneficent purposes of the chapter by temporarily giving up the custody of these illustrations to Messrs. Wright & Avery, who are members alike of the Chapter and of the League. It is hardly necessary to add that the photographs were all returned duly and in good condition.

Respectfully submitted,

E. H. KENDALL,
H. H. HOLLY,
JAS. E. WARE,
THEO. DE LEMOS,
A. J. BLOOR,

Welles Building, 18 *Broadway, N. Y.*,
January 11, 1888.

COMMUNICATIONS

WHO MAKES IRON CHURCHES?

PHILADELPHIA, PA., January 20, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Can you or any of your readers give the names of parties who construct iron churches in the United States? In England such buildings for use not only in that country but in warmer climates are made upon designs prepared by church architects, and their use presents obvious advantages where temporary buildings are desired for missions, or where parishes are not strong enough to erect permanent buildings, or where shifting population may require future removal. In many if not all large cities, wooden buildings are not allowed, and if iron churches can be furnished at a reasonable cost, a great want would be supplied. M.

THE DECORATIONS OF McVICKER'S THEATRE, CHICAGO.

CHICAGO, ILL., January 18, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Will you kindly give space to a correction of Mr. C. H. Blackall's paper, "Notes of Travel," which appeared in your issue of December 24th, erroneously giving credit to Messrs. Adler & Sullivan for the decoration of McVicker's theatre. The work was executed under my charge and dictation and was my own conception without control of architect or owner. Yours faithfully,

JOSEPH TWYMAN.

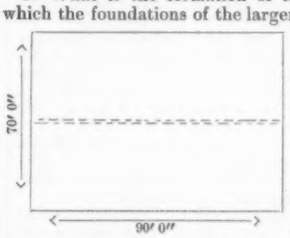
THE BEARING CAPACITY OF NEW YORK SUBSOIL.

CHICAGO, ILL., January 10, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Would be pleased to get information on the following questions:

1. What is the formation of the subsoil of New York City on which the foundations of the larger and heavier buildings are placed, and what is the bearing capacity per square foot of this subsoil as accepted by architects.



2. Which is the best method of constructing the floor of a dance-hall so as to practically deafen noise as much as possible and also to avoid the vibration of ceiling below to prevent cracking of plaster, etc. Hall is 70′ x 90′, and has only one line of supports through centre below. Would it not be advisable to make ceiling joists of apartments below independent of floor joists?

By answering the above question you will confer favor on a

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[1. The lower portion of New York City stands mostly on gravel, varying in resistance from the hard central ridge, along which Broadway runs, to the river-banks, where it is mixed with mud and is quite soft. From Madison Square northward to Harlem, the subsoil is mostly gneiss rock, capable of bearing almost any weight, and at the northern extremity of the island limestone appears. So far as we know, there is no rule accepted by architects for the bearing capacity of the soil in the lower part of the city, which is the only portion in which it usually needs to be considered. On and near Broadway five tons to the square foot would not be too much, but east or west of this line the resistance varies greatly, and it is common before designing foundations to consult the records of the Department of Buildings, where very valuable notes of the character of the subsoil in various parts of the city are kept and explained to architects with the utmost courtesy.

2. As suggested, the only efficient way of deafening the floor of such a dance-hall is to use ceiling-joists entirely independent of the floor-beams.— EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

A STATUE OF BUDDHA AT NARA, JAPAN. — This town of Nara, Japan, was once a great city. Where to-day in the Valley the rice fields spread their carpets of verdure there once were long streets lined with houses and the palaces of princes. To-day there are but 21,000 inhabitants in the place. Once there were nearly a quarter of a million. Nara was the capital of Japan from 709 to 784 A. D. It was a great city when London was in its infancy, Paris a mere village and Berlin a wind-swept waste. The site of the Mikado's palace is now a broad field of growing grain three miles to the west of the present town. The temples and shrines of that olden time are nearly all gone, having been burnt, or having fallen down and been consumed by the elements. A few only of the works of the past remain to attest the fact that the civilization of Japan in the eighth century in many respects was equal to that of the nineteenth century. Among these monuments of bygone days the most famous is the great image of Buddha. This stands in an ungainly building, the roof of which is seen peering above the trees on the mountain-side. This building is quite modern, having been erected about the beginning of the last century as a protection to the huge idol. It is surrounded by a broad garden, which is enclosed

by a gallery built of wood and white plaster, the upright beams being painted red. The building is said to be a feeble reproduction of the great temple originally erected by the Mikado Sho-mu Ten-no, in the year 750 A. D., but which was burned. Sho-mu Ten-no was a devout Buddhist who held the reins of power in Japan when Charlemagne was still a child. He conceived the idea of erecting an immense image in honor of Buddha but, as the story runs, was filled with fear lest the native deities of Japan should be offended. He accordingly sent a priest to the temple of the sun goddess to ascertain from her how she would regard the project. The priest, whose name was Gio-Gi, passed a week patiently waiting under an oak tree near the temple gate. Upon the morning of the eighth day the doors of the chapel were flung open and the sun goddess presented herself in person and announced that "the Sun is Biroshana" — that is, one of the persons of the Buddhist Trinity, and declared her approval of the plan of the Mikado. He accordingly announced his intention to erect an image of gold and copper one hundred and sixty feet high and in A. D. 743 ordered the people of Japan to send in their contributions and in 744 himself superintended the construction of the model. The original design of constructing a bronze figure 160 feet high was apparently abandoned, and the actual result was a figure which is only 53 feet in height. This huge bronze idol has passed through many vicissitudes during the 1138 years since it came from the hands of the founders. In 859, A. D. the Great Buddha "lost his head," which had not been properly secured. Skilled workmen succeeded at once in putting a new and stronger head upon him. In 1180, during one of the civil wars by which Japan has been from time to time convulsed, the temple covering the image was burned and the new head was melted. The image and the temple were soon both restored; but the head troubles of the old idol were not at an end yet. In 1567 the temple was again burned, and when the smoke cleared away it was discovered that once more Buddha was sitting with the molten remains of his face and cranium sticking to his arms and shoulders like tallow to a dying taper. This lamentable state of affairs led a generous private person to give a sufficient sum to repair the damage, and the workmen once more succeeded in putting a head on Buddha. Until the beginning of the last century the image was doomed to remain unprotected, and passed the time as a nurebotoke or wet god, as the Japanese say, exposed to the assaults of rain and storm and the defilement of birds. In 1710, or thereabouts, the priesthood and the laity built the present great barn-like structure. — *W. J. Holland in the Philadelphia Press.*

Who W. J. Stillman Is. — The editor of the *Century* submits to the New York *Evening Post* a letter from a New Hampshire subscriber, which reads:

"You will confer a favor on me if you will tell me who W. J. Stillman, author of the paper on John Ruskin, in the January *Century*, is, and a little something of him, or at least where I can find such general information as one likes to have of those whose papers he is reading. I have referred to everything I could think of within my reach, and still I have to leave unanswered a number of questions. "Who is W. J. Stillman?" It seems to me as if I could place the man, but when I try I fail. I enjoyed this article (John Ruskin) much — not to mention a number of others — and it has caused me to begin reading Ruskin critically, which makes me wish the more to know of Stillman."

The editor suggests that a reply to this inquiry through *The Evening Post* would outstrip his own in the magazine itself. Our readers certainly could have no difficulty in "placing" one who a few years ago was the art critic of *The Evening Post*, and is still a frequent contributor on his special subject as well as on divers others. Mr. Stillman, to begin at the end, is now the Roman correspondent of the London *Times*. He was born in Schenectady in 1828, was graduated at Union College in 1848, in the same class with the late President Arthur, and took to painting as his profession, receiving instruction in landscape from F. E. Church, N. A. In the winter of 1849-50 he went abroad for a few months, and made the acquaintance of Turner and other leading English painters, and, more intimately, of Mr. Ruskin. Up to 1852 he was painting in the Adirondack country, when his admiration for Kossuth led him to embark in a hazardous mission to Hungary, which did not succeed. On this trip Mr. Stillman studied in Paris, in the school of Yvon. In 1856, with Mr. John Durand, he founded the art journal the *Crayon* in this city, which he conducted for two years. He was abroad again in 1859, making a summer tour with Mr. Ruskin in Switzerland. In 1861 he was appointed United States Consul to Rome, and in 1865 was transferred to Crete, where he witnessed and became the historian of the last unsuccessful rising in that island. In 1869, being out of the service, he brought out a noble volume of photographs of the Acropolis at Athens, the views being taken by himself. Since that date literature rather than painting has been his vocation, but he has never ceased to pursue photography as a pastime, to which he has contributed many useful inventions and several manuals. His services as correspondent of the London *Times* enabled him to write a history of the revolt in Herzegovina that preceded the great Russo-Turkish war of 1877-78. His latest publication is "*In the Track of Ulysses*," which we have just reviewed in these columns. Mr. Stillman is familiar with all parts of the Levant, is caricatured in the press of the war party in Greece, and so hated and feared by the Turks that he is forbidden to enter the Sultan's dominions. We ought to add that a fuller account of his checkered life than we can give here is to be found in the *Photographic Times* for September 9, 1887. — *N. Y. Evening Post.*

The Lower Organisms in Cistern Water. — Mr. Gustav Bischof has extended Dr. Koch's method of estimating the number of microscopic organisms in a sample of water in such a way as to show how dangerous it may be to drink water which has been stored in a cistern for several days. Dr. Koch's method was, briefly, to mix a measured quantity of water with some sterilized gelatine spread over glass plates. After two or three days numerous spots, due to "colonies" of minute creatures, are visible to the eye, and their number is a measure of the organisms in the original water. Mr. Bischof has prolonged the duration of the test from three days to nine. He finds that the total number of colonies is thus largely increased, particularly in the case of filtered water. Thus a quarter of a teaspoonful of water, which gave 53 colonies in three days, yielded 158 colonies in nine days. A similar quantity of water, taken from the same main and stored for six days, not in an open house cistern liable to all sorts of contamination, but in properly protected vessels, yielded 3744 colonies of living creatures in the short, and no less than 115,344 in the longer period. Such facts belong to the marvels of creation, but their practical use is to show how very important it is that house cisterns should be frequently emptied, and that water should not be left to stagnate in bedroom water bottles. As *Engineering* points out, even filtration evidently allows a large number of organisms to pass which are capable of this great development.

Afghanistan Wind-mills. — A clipping from the *Milling World* says that Thomas Stevens, who recently bicycled around the world, has given the following description of peculiar wind-mills used on the frontier of Afghanistan, in Asia: High noon finds us at our destination for the day, the village of Tabbas, famous in all the country round for a peculiar wind-mill used in grinding grain. A grist mill or mills consists of a row of one-storied mud huts, each of which contains a pair of grindstones. Connecting with the upper stone is a perpendicular shaft of wood which protrudes through the wood and extends fifteen feet above it. Cross pieces run through at right angles, and plaited with rushes, transform the shaft into an upright, four-bladed affair that the wind blows round and turns the mill-stones below. So far this is only a very primitive and clumsy method of harnessing the wind, but connected with it is a very ingenious contrivance that redeems it entirely from the commonplace. A system of mud walls is built, about the same height or a little higher than the shaft, in such a manner as to concentrate and control the wind in the interest of the miller, regardless of what way the wind is blowing. The suction created by the peculiar disposition of the walls whisks the rude wattle sails around in a most lively manner. Forty of these mills are in operation at Tabbas, and to see them all in full swing, making a loud "sweshing" noise as they revolve, is a most extraordinary sight. Aside from Tabbas, these novel grist-mills are only to be seen in the territory about the Seistan Lake.

TRADE SURVEYS

The volume of business for the dead of winter has not been disappointing. Restricted mercantile operations are indicated by a return of a large amount of currency to Eastern financial centres from its Western pilgrimage. Manufacturing activity is fair in all sections. Mining operations are being conducted on the usual scale except in a large portion of the anthracite region. Shop and factory capacity is quite busily engaged on spring work. New enterprises are quite freely spoken of, some of them of very large proportions. The volume of money to all appearances will continue to increase. Foreign investments are not checked, and there is much anxiety abroad to find good speculative opportunities. Real-estate has not been handled much of late in the Western States owing to the apprehensions created over the overdone talk of restricted railroad building operations this year. For actual building requirements more than ordinary activity has been displayed among buyers and sellers of real-estate, especially in the larger cities. As to probabilities of a general advance of real-estate in manufacturing centres, the signs are not so propitious from the sellers' side. Concerning mortgage indebtedness, the snowball has been rolled until the lenders look like pigmies behind it, but every essential feature is safe. The earning capacity of the country has been greatly increased by these loans, and a volume of business has been done which would have been impossible but for its use on the scale of magnitude seen last year. Speaking specifically the industries are doing well. The paper-mills in some localities have been stopped. The electrical, hardware, textile and shoe-making interest of New England have no reason to complain. The jobbing interests have effected an immense distribution, and the jobbers who talk see no cyclones ahead. All through the New England States there is an air of contentment in the manufacturing interests. The possibilities of adverse legislation cause more scare than they will probably cause hurt. The competition of foreign goods will probably increase rather than decline, but this pressure will, no doubt, reach in the production of finer qualities of goods. It is guesswork to say what will be the outcome, but not half the evil is probable that is foretold. The building activity in New England will be greater than last year, so builders predict, because of the steadier work, steadier wages and greater accumulation of the workers who are now more than ever directing their attention to the securing of a home. Reports from nearly all our larger Maine, Massachusetts and Rhode Island mills and manufacturing establishments show that employment will be equal to the supply. There is a constant but quiet weeding out of skilled labor in these States which finds welcome in newer places at higher pay, and hence all other things being equal there is an upward tendency in wages, but not strong enough to show itself in figures except where successful strikes cause it. There will be fewer labor strikes this year, and comparatively little agitation for shorter hours. Congressional action will hardly reach the point of shutting out foreign labor, and it is a question whether artificial expedients, even if applied, would help. Building enterprise will be less subjected to interferences this season as employés intend to act, and to act conservatively in time. The iron trade is strong. Prices are close to cost. Rails are not selling freely, but some day soon the announcement will be wired over the country that orders aggregating a half million tons have been placed. Manufacturers of agricultural machines will restrict production largely this year, it has just been definitely announced, and a strong combination will be attempted before spring opens. Wood-working machinery have still a good block of business on hand, but they are watching how things are likely to go after booked orders are filled. Furniture manufacturers on account of the extraordinary house-building of the past few years have been driven, or rather tempted, to use inferior and cheaper woods, and thus meet an expanding demand for cheaper furniture by a liberal use of improved varnishes and paints. Gum, cotton-wood, cypress, sap and other woods are coming in, and yellow-pine is making a vast market for itself, and growing in the estimation of architects and builders. The furniture manufacturing interests in this way anticipate better margins this year, but the sunshine will be like an April one. The use of lumber is gaining per head of population in spite of brick, because of the much greater building activity in rural localities where wood is so generally used.

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Grand Opera House, Paris.

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Heliotype Printing Co. Boston

Paris. After an etching by U.A. Mitchell.

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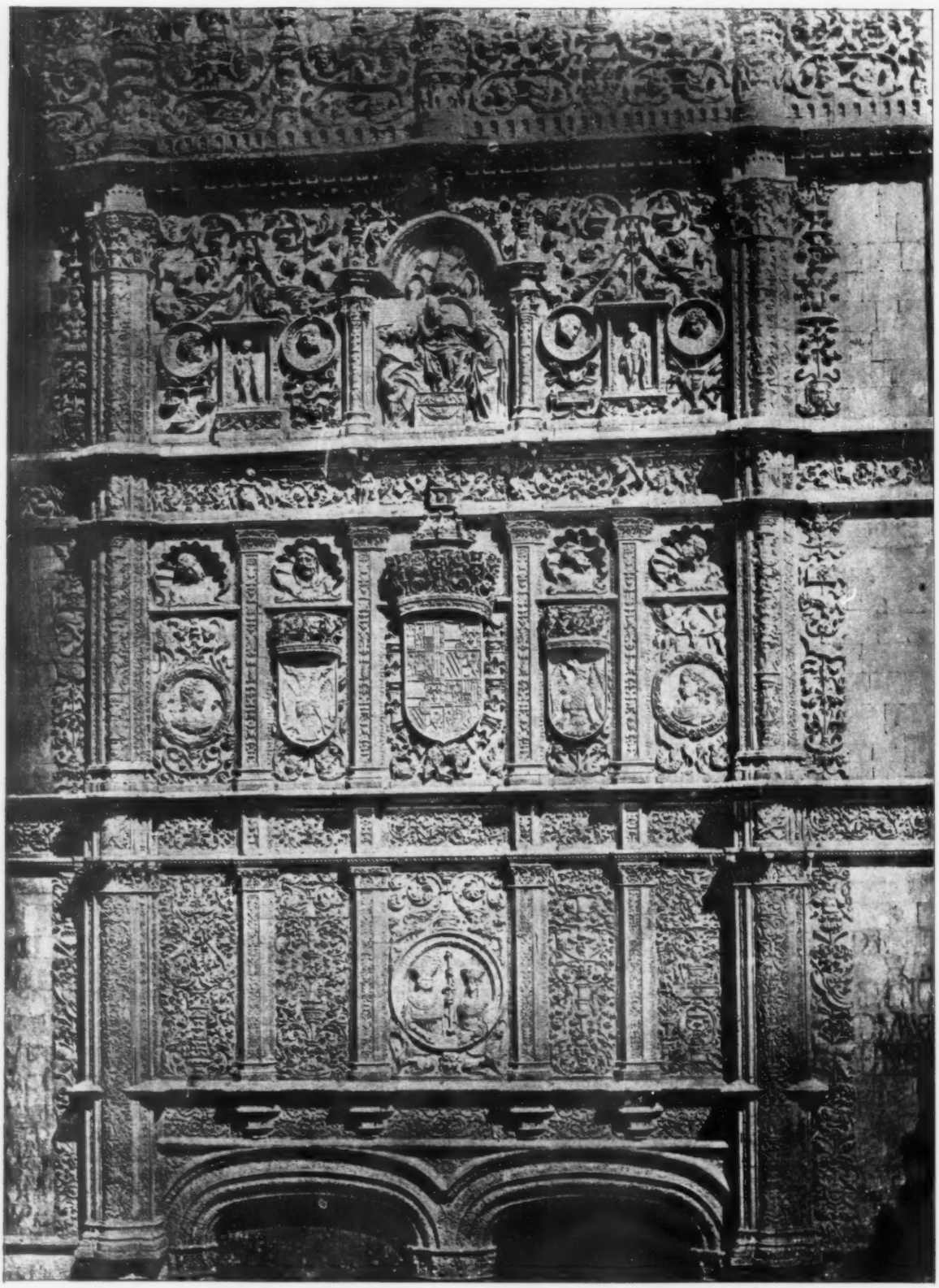

Heliotype Printing Co. Boston.

From the façade of the University, Salamanca, Spain.

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DESIGN FOR BUSINESS BLOCK. BY A.B. STURGES TOLEDO O.

Heliotype Printing Co. Boston.

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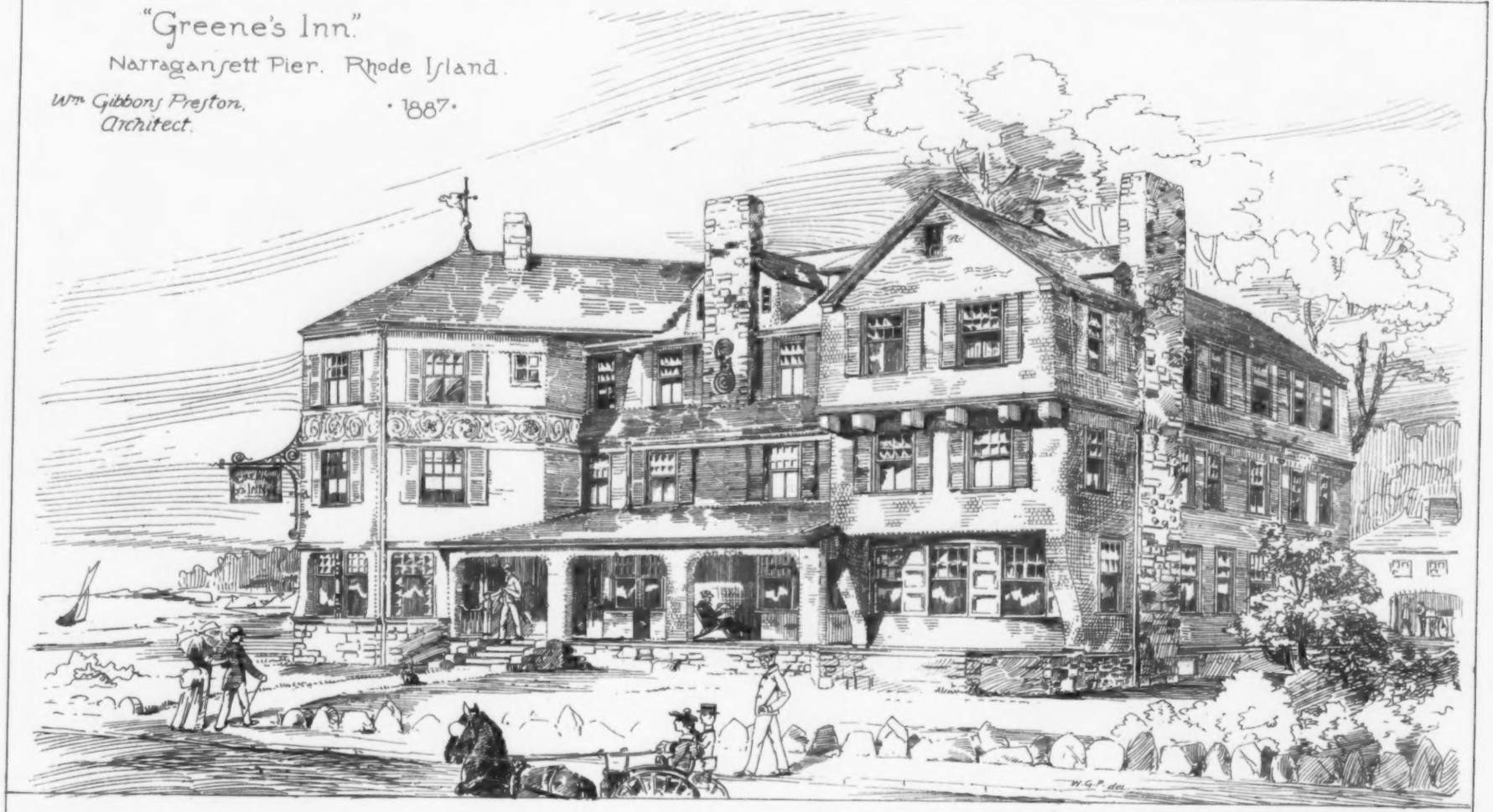
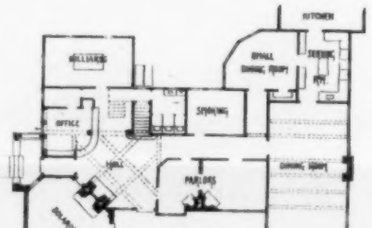
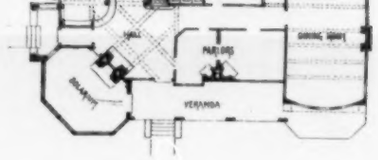
"Greene's Inn."

Narragansett Pier. Rhode Island.

Wm Gibbons Preston, Architect. · 1887 ·







In the Solarium.

Wm Gibbons Preston,
Architect.

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